JPRS-ESA-84-046

26 December 1984

East Europe Report

SCIENCE AND TECHNOLOGY

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-ESA-84-046

26 December 1984

EAST EUROPE REPORT

SCIENCE AND TECHNOLOGY

CONTENTS

MAN-MACHINE COMMUNICATION RESEARCH FOR ROBOTICS REPORTED

Magdeburg VOLKSSTIMME in German 18 May 84 p 4

[Article by Prof Dr Karl-Heinz Tempelhof, Dr Rudolf Meyer, Engineer, 'Otto von Guericke' Technical College: "Man is Speaking With Robots"]

[Text] Talking robots--machines which understand human speech, i.e. pieces of equipment which are able to correctly carry out spoken instructions--who hasn't been amazed or even fascinated by such fantastic products of utopian film-making in past years? The idea that one day vacuum cleaners or kitchen appliances will perform their assigned duties automatically as the result of commands simply spoken to them has given wings to man's imagination. Skeptics said expectations of such developments were unrealistic in the near term, and dismissed them whenever possible as pure fantasy...

...but look what has happened--voice communication between man and machine has been made possible through increasing automation in all areas of human activity, primarily as a result of revolutionary developments in the field of microelectronics, and has made astounding progress just in the past few years. This is evidenced by such products as talking robots, talking clocks and watches, speech-controlled vehicles, etc.

Speech communication is understood as the exchange of information between man and machine in the form of human speech. Such machines for which speech communication seems advantageous or at least worth considering are computers, machine tools, robots and manufacturing units, among others. Why? Using normal speech allows the human operator to more quickly, more effectively and--last but not least--more easily perform drastically changing tasks within the scope of preparation for use and control of automated systems through revolutionary new scientific and technical advances. These are primarily tasks such as programming, monitoring and controlling automatic machines and systems. Of course, the method of communication implemented is the one which is most effective. In the near future, for example, the most effective way of controlling our home appliances will continue to be by using customary, simple manual buttons and switches.

Worldwide sales of devices capable of speech communication are increasing at an annual rate of over 40 percent. Market analysts feel that no other form of man-machine communication currently has such market potential. In the GDR,

too, work is continuing in the development of speech communication equipment. This equipment and its beneficial application are the subjects of intensive research at the Technical College in Magdeburg, among other institutions.

Speech communication involves speech input and output, also referred to as phonetic input and output. The most recognizable characteristic of such communication is that data is input via a microphone in a manner similar to that used in making tape recordings, and is output via a speaker. Of course, phonetic input and output can be performed using individual units, if this type of data manipulation is more favorable given the requirements in certain applications, or in combination with other communication devices such as keyboards, paper tapes, or the like.

The central functional feature of phonetic input is speech recognition, i.e. identification by the speech recognition system with as few errors as possible of sentences, words or symbols input via microphone and transmission of this information to other connected systems as required for further processing. Incorrect identification of movement instructions for an industrial robot, for example, can lead to serious material damage.

Speech recognition systems either recognize individual words or connected speech. Systems which recognize individual words are farthest along in development and practical application, whereas recognition of uninterrupted sequences of words and sentences is still technically very difficult. In individual word recognition, the vocabulary is input via microphone with short pauses between words so that the speech recognition system can detect the beginning and end of each word. Systems today are able to recognize between 50 and several hundred words or symbols, depending upon the capacity of the input hardware. Operation of these speech recognition systems is based on the fact that each word has its own frequency characteristics, its own "wordprint".

Speech input systems to date have become known primarily for data acquisition in conjunction with computers. Experience in the use of phonetic input--particularly in the fields of quality control, transport, storage and numerical control of production equipment--has shown that the better the specific advantages of speech input are utilized, the better the performance of phonetic input as compared to traditional methods of information input.

In terms of the international level of development, phonetic output has reached an advanced stage. Speech output systems on the market today process individual words as well as connected speech. The vocabulary to be phonetically output is practically limited only by the amount of hardware which is appropriate for a given application.

Primary applications for speech output are telecommunications (automatic information and announcement systems) and working processes and areas which can be controlled or monitored without the need for human intervention (distributing centers, largely automated manufacturing equipment, unmanned control stations, etc.).

Although there is still research and development work to be done in the field of speech communication processes, it is predicted that increased use of such systems in place of or together with traditional forms of communication can also be expected in the GDR.

12644
CSO: 2302/31

ROBOTICS APPLICATION IN CONSTRUCTION INDUSTRY ASSESSED

East Berlin BERLINER ZEITUNG in German 1 Aug 84 p 3

[Article by Hans Erdmann]

[Text] Under the headline "Zimmi Welds the Cleanest Seams" we reported about a year ago (June 14, 1983) on the use of the first robot in the construction industry in Berlin. Since then young people from the civil engineering combine in Heinersdorf have been using the ZIM-10 welding robot ("Zimmi") to repair loading buckets, dipper buckets and other parts of excavators and other construction machinery, and with a good deal of success. In particular, the FDJ within the civil engineering combine was involved in putting the robot to work.

Other construction combines, too, have in the past been and continue to be involved in the development, manufacture and use of robots and microelectronics. In the final analysis, the main advantages of robots serve to increase productivity in the construction sector.

How has the use of robots progressed within the construction industry in Berlin? According to statistics provided by the Bezirk building authority, robots and microelectronics had been used in 46 individual applications by the end of 1983, and 27 units had been manufactured. The same technology, although to a differing degree, was implemented in all construction combines in Berlin. The civil engineering and building construction combine, for example, uses a lathe in conjunction with a welder controlled by microelectronics, the housing construction combine uses among other devices a loading manipulator for KAMAS trucks, the civil engineering combine uses the above-mentioned welding robot as well as a dialog-oriented work station for design engineers (an extremely important piece of equipment), and the VEB stucco and natural stone has an unloading manipulator for concrete ashlars.

Needed Everywhere, but Developed by Others

Of the 47 applications of this new technology to date in the construction industry in Berlin, 29 were the result of developments by the construction academy, machine construction enterprises or other combines or institutions, while only in a disappointing 11 instances was the equipment developed by the construction enterprises or construction combines themselves. In general,

this new technology has been primarily used in mechanization enterprises, in machine and equipment repair procedures, in charging equipment at work stations for prefabricated products and in automated or semi-automated equipment used for processing semifinished products, workpieces and components. These are more or less one-off solutions.

The Permanent Construction Industry Commission of the City-Kreis Assembly of Berlin, which in the spring of this year took up the question of the state of affairs in this area, thus also determined that such equipment has in the past not been used as envisaged or with sufficient long-term planning. It was also for this reason that the two goals of maximum utilization of this highly productive technology as well as release of some members of the work force to assume other jobs were only achieved to a certain degree. A series of important projects such as a manipulator for spot-welding machines and a washing system for concrete ashlars were not realized last year. Much work has already been done on other projects, such as the robot for transporting bags of cement in the VEB Building Materials Supply in Berlin, without practical results. Long-term plans for implementation of this new technology do not exist in most of the construction combines in the capital city. In other words, it is not technical or financial problems which are primarily responsible for holding up progress in this area.

Important criteria for effective implementation of robots are the release of members of the work force as well as maximum utilization of robots on a daily basis. The planned release of 2.5 workers per robot remains a goal; only an average of 1.3 workers per application have to date been reassigned. Only an average of 11 hours of operation per day has been achieved instead of the target figure of 16 to 19 hours.

"Zimmi" Does More Work Than Two Shifts

For example, the welding robot is only used during two shifts in the civil engineering combine, but it makes the work of the young civil engineers easier in a number of ways. Utilization of the robot has certainly improved as compared to the test phase (a series of peripheral tasks has also been established for "Zimmi"), however to increase robot utilization to three shifts next year clearly requires more planning. To date, "Zimmi" appears to be too productive for the civil engineering combine, although here the real problems are proper utilization planning and organization.

More intensified scientific and technical activity in the combines is also necessary in order to make more rapid advancements in the implementation of robots in such areas as expansion and modernization of housing. And of course, cooperation with the Construction Academy must also be increased. It is the expressed intention of construction researchers in the capital city to realize a series of joint projects and to break new ground in the utilization of robots and microelectronics.

12644
CSO: 2302/31

ARTIFICIAL INTELLIGENCE, ROBOTICS TECHNOLOGY RESEARCH DESCRIBED

East Berlin BERLINER ZEITUNG in German 6-7 Oct 84 p 13

[Article by Guenter Ludvik]

[Text] Numerous institutes and other scientific facilities have been established just in the past few decades. Although no older than the GDR itself, they have already established national and even international reputations. One such facility is the Central Institute for Cybernetics and Information Processes (ZKI) of the Academy of Sciences. Thirty five years after the founding of the GDR, this institute can look back on 15 years of successful activity.

Image evaluation will play an increasingly important role in the future. Examples of fields in which images play a key role are remote sensing of earth-bound parameters, medicine, biology and industry. Using computers and digital image processing techniques, comprehensive evaluation of graphic information can be realized. One product of research at the ZKI is the BVS A 6471--A 6473 image processing system developed in close cooperation with the GOSNIZIPR Remote Sensing Center in the Soviet Union, and now under construction in the Robotron Combine.

Solutions to Applications Problems Always of Primary Importance

"The way in which scientists and engineers from various disciplines and their theoretical know-how, experience and approaches in developing this project were brought together to form a collective sets an example for all research collectives at the institute," said Dr Volker Kempe, director of the institute. The ZKI has also won itself a position of respect in the Academy as a result of its work on this project.

The ZKI was founded in 1969 for the purpose of establishing the scientific foundation for automating technical production preparation procedures. A new stage of research was reached with the long-term planning of a main cybernetics research group begun in 1973. Work on solutions to important economic problems was accomplished within the scope of the four research topics "fundamentals of cybernetics" (later: artificial intelligence), "cybernetic equipment engineering", "technical cybernetics" and "modeling of non-technical systems". This reorientation made it possible to coordinate basic research more

closely with applied research. Upon conclusion of the 10th SED Congress the most important long-term orientation goals were established and tasks more precisely defined in line with new social requirements on the scientific community.

New tasks include robotics research, research on the use of microcomputers in automation and information systems as well as research into ways of improving special design processes in systems automation.

"In this 35th year since the founding of the GDR, the ZKI is contributing to the development of fundamental processes and methods of control and optimization of complex technical and non-technical systems as well as computer-aided information processing techniques for design and analysis which can be used in a broad range of applications," said Dr Kempe. Research on artificial intelligence involves the development and implementation of both the software and hardware for processes to automate and rationalize formalizable intellectual processes for more complex tasks in diagnostic, detection and data management systems. Applied systems analysis is concerned with the development of computer-aided simulation methods and the preparation of complex decision-making processes. In the field of technical cybernetics, researchers are concentrating on design and implementation of microelectronics modules and systems for automation as well as on control engineering fundamentals in modeling and controlling interconnected electronics/energy systems and large-scale power plants.

Industrial Robots Have Learned How to See

Many research results are the products of tasks which have been realized in conjunction with industry or other users within society.

Also of great significance is the modular Mavis-1 video system. A CCD video camera, lighting system, transport system and microcomputer make it possible for an industrial manufacturing robot to recognize parts and their positions as they arrive during assembly, picking or machine outfitting. In this way, parts which do not meet specifications can be discarded. Pre-positioning is also not necessary. Using the software package "rule of precedence optimization", preliminary planning calculations can be modeled. The user is thus able to devise the optimum strategy for a draft plan.

12644
CSO: 2302/31

TELECOMMUNICATIONS EQUIPMENT AT 1984 LEIPZIG SPRING FAIR

East Berlin NACHRICHTENTECHNIK-ELEKTRONIK in German No 3, 1984 pp 83-86

[Article by K.H. Weidenbruch et al., Leipzig, VEB Telecommunications Combine]

[Text] Equipment from the VEB Combine Communications Electronics

RFT (Radio and Telecommunications Technology) Communication Electronics for World-Wide Communications

This was the governing topic under which the VEB Combine Communication Electronics presented its Fair equipment for the 1984 Leipzig Spring Fair. The high scientific-technical level of devices and systems from the GDR becomes clear in five user-oriented equipment complexes in conjunction with other combines, using selected problem and system solutions as examples. New documentation is presented that the RFT communication technology uses microelectronics, digital technology, optoelectronics, and fiber-optic light-guide communication transmission in a well-directed manner, and that it can satisfy even the most stringent claims as regards utility for the user, use-value properties, weight/performance ratio, specific energy consumption, as well as easy assembly and optimum service.

Efficiency in the Office

This complex of equipment shows that efficient working methods and fast decision making are inconceivable without using modern electronic working means. In this connection, products from the VEB Combine Robotron - minicomputers and microcomputers, video screen terminals, printers, and the like, which will not be discussed in more detail at this point - are being presented jointly with modern means of communication for speech and writing from the VEB Combine Communication Electronics. The interaction of communications technology and computer technology is presented in terms of several characteristic examples.

Naturally, the telephone equipment family Apart 2001 and electronic telex equipment are also included within this equipment complex.

Means of Communication for Public Services

This complex of equipment is the central point of the exhibits of products from the VEB Combine Communication Electronics. It clearly shows how broad the pallette of modern communication means must be to do justice to the manifold requirements for communication at all levels.

The VEB Combine Robotron has furnished interesting applications for making banking and saving services more efficient, e.g. an automatic teller, as well as a switching terminal for issuing tickets. Furthermore, data transmission is demonstrated via a PCM directional radio link.

The VEB Combine Communications Electronics is represented with four applications, namely RFT ground-based telephony, RFT short-wave broadcasting systems, RFT transmission technology, as well as an RFT audio studio.

RFT Ground-based Telephony

RFT ground-based telephony has already proven itself in many countries. It offers communication links to remote areas, which economically have not yet been opened up or have been opened up only a little.

The UHF/VHF radio telephony system makes possible a wireless connection of telephone equipment through radio channels. By means of this system, telephone subscribers in thinly settled areas or areas that are hard to access can be connected to the public network. In such areas, the construction of cable or overhead lines may be impossible or would require an unreasonably great financial and material expenditure. Natural geographic obstacles - mountains, waters, swamps - are bridged over effortlessly by directional radio links. Conservation areas remain untouched. Destruction by cabling work is eliminated. Climatologically based natural catastrophes, for example floods, avalanches, and quicksand, as well as deliberate destruction, cannot impair the radio telephony system.

The VHF/UHF radio telephone system is designed in such a way that it can be set up quickly and can be transferred into another region if needed. It is superior to a wire-bound network economically, especially when the distances to subscribers become relatively large. The intersection point of equal costs for radio and wire linkages lies at distances between 3 and 9 km. The maximum possible distance of a subscriber from the concentration point is determined by the radio line-of-sight limit.

For the subscriber, radio telephony is no different from a conventional telephone connection. The connections are made by the subscriber's dialing and the usual telephone sets are used. Secrecy of the conversation is preserved by blocking the transmission channels to unauthorized parties.

Smaller high-density areas and agricultural areas are opened up by the microcomputer-controlled, digital local central OZ100D. This can be used as a regional central, a local central, or a subcentral with internal traffic. Digital directional radio technology - with 10 channels, especially designed

for areas with a low traffic volume - as well as the proven low-channel carrier-frequency transmission technology, which can be used to supplement or expand already existing networks, round out the comprehensive equipment of RFT ground-based telephony.

It must also be mentioned that this system can implement telex communication.

Examples of the successful use of the RFT ground-based telephony system are the networks in the Mexican state Guerrero, in which 45 communitees were connected to the national telephone network.

RFT Short-wave Radio Systems

Short-wave radio technology has proven itself for decades in connection with communication transmission over short, medium, and large distances. Even after radio services were introduced at other frequencies, and after satellites were used to transmit messages, it has not lost its significance. Because of its technical degree of maturity, it is well-suited for rapidly building up communication links in national, international, and intercontinental long-distance traffic.

The VEB Combine Communications Electronics produces equipment for radio transmission and reception, by means of which one can construct systems which are capable of implenting short-wave radio traffic in all practical operating modes and over arbitrary distances. Short-wave transmitters are available in power stages of 1, 5, and 20 KW.

The short-wave transmission system KSS 1300 represents the 1 KW class, which is intended for use on land and water vehicles, in containers, and in fixed broadcasting stations. Manifold accessories, from an operating channel up to the logarithmic-periodic antenna, secure full utilization of the high utility value of this transmission system. Computer support opens up new types of operations with minimal servicing. The commercial receivers of the type series EKD 100 and EKD 300 provide optimal signal processing procedures and thus secure the reception and demodulation of even very small high-frequency signals.

An example of a system solution for the RFT short-wave radio technology is the radio container KFC 1300. This mobile 1 KW short-wave transmission and reception system has many uses and is installed in a vehicle trunk of the type "Koepenick" of the VEB Vehicle Construction Halle (dimensions: 4260 mm x 2440 mm x 2000 mm without antenna). Thus, the expenditure of time and materials for setting up a short-wave transmitting/receiving system, up to the start-up of broadcasting operations, is very low. Because of the mobility of the system, the deployment site of the radio container can be changed in a short time.

The main components of the mobile short-wave transmission/reception system are the devices of the 1 KW short-wave transmission system KSS 1300. By using suitable antennas, intercontinental distances as well as distances in the local region can be reliably bridged over with this system.

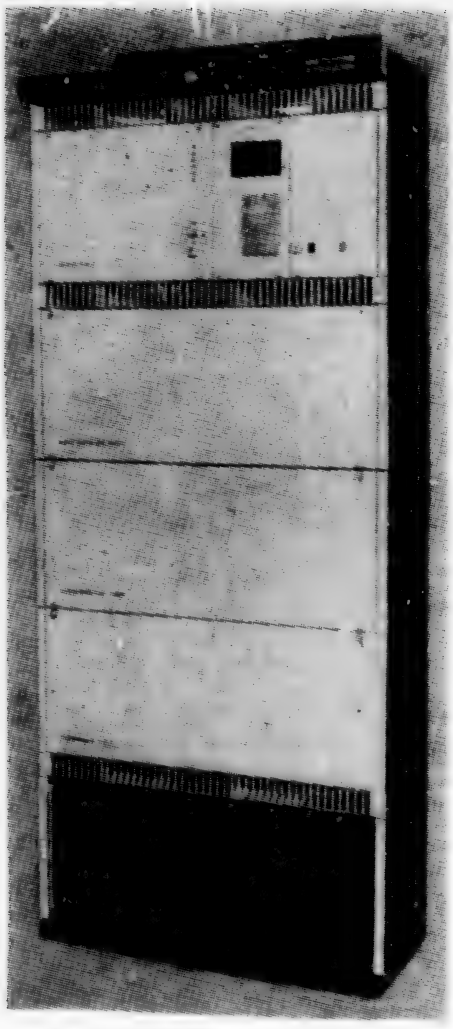

Figure 3: Fully electronic digital relay center OZ 100 D

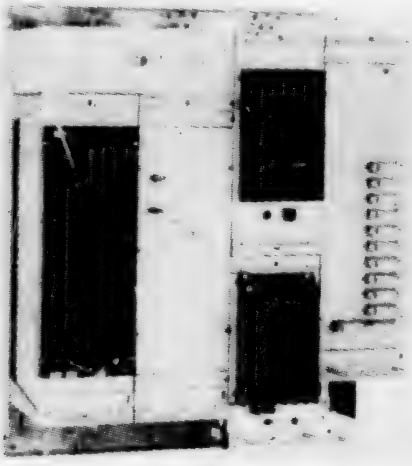

Figure 4: Digital radio link system PLM 10-400/800

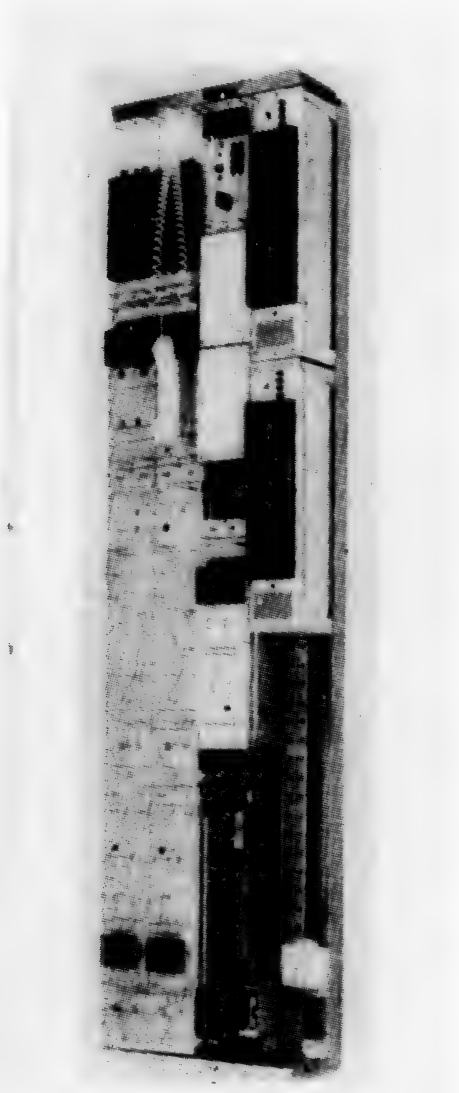

Figure 5: Digital radio link system PLM 120-2000

In this connection, it should be mentioned that the largest radio transmission center in Latin America, in Mexico, is equipped with RFT radio technology.

For Morse-code communication transmission under rough operating conditions, an automatic microcomputer-controlled Morse transducer is being offered. The information is entered by means of a typewriter-like keyboard.

An extensive program of products concerned with field strength and voltage measurements is available for the planning, start-up, and monitoring of radio networks in the short-wave and USW range.

RFT Transmission Technology

An outstanding example of a future-oriented system solution is the fiber-optic light-conducting transmission system DUES-LL 8. This system was designed with an emphasis towards its use in city networks. Here, the structure of the telecommunications network is essentially given. The existing installations - especially also the cable routes - which generally are fully occupied and whose expansion would entail considerable construction and costs - can be used for many decades more by using the RFT PCM transmission technology and the above-mentioned fiber-optic light-conducting transmission system. The great economic significance of saving copper in the use of fiber-optic light-guided communication transmission has already been reported several times elsewhere. The associated measuring system is also very important for the effective use of the fiber-optic light-guided communication transmission system. This measuring system makes possible efficient and rapid start-up measurements, operating and maintenance measurements on fiber-optic wave-guide transmission systems in communication technology as well as in short-range transmission technology.

Level and damping measurements of high precision are possible with the optical level measuring stations OPM. The optical trouble-location set OF is used to locate trouble points in fiber-optic wave-guide cables. It is operated in conjunction with the conventional trouble-location units.

Fiber-optic light-transmission guides from the VEB Combine Communications Electronics are used successfully in the network of the German Post Office of the GDR.

RFT Audio Studio Technology

RFT audio studio systems for stationary and mobile use in radio and television, for concerts, sports, social events, etc. are distinguished by practical solutions, highest reproduction quality, and pleasing design. Under the slogan "quality that you can hear", several exhibits designed for a broad group of users were displayed at the Leipzig Spring Fair.

RFT audio studio systems have an outstanding track record, among other places, at Radio Afghanistan, in Cuba, in the Berlin State Opera, as well as in the new Gewandhaus in Leipzig.

Efficient Production

Practical solutions from various combines were presented in this equipment complex. Here, the VEB Combine Communication Electronics makes an especially interesting contribution:

The line sequential video camera ZFK 1020 is the basic component for the modular RFT picture detection system for automation technology, especially for interaction with industrial robots. Sensor cells, which can detect optical information even under industrial conditions, are used as the radiation receivers for picture and character detection. Application examples of the

ZFK are the measurement of metallic workpieces, the measurement of the area of surfaces, the counting of objects, and the localization of damage points.

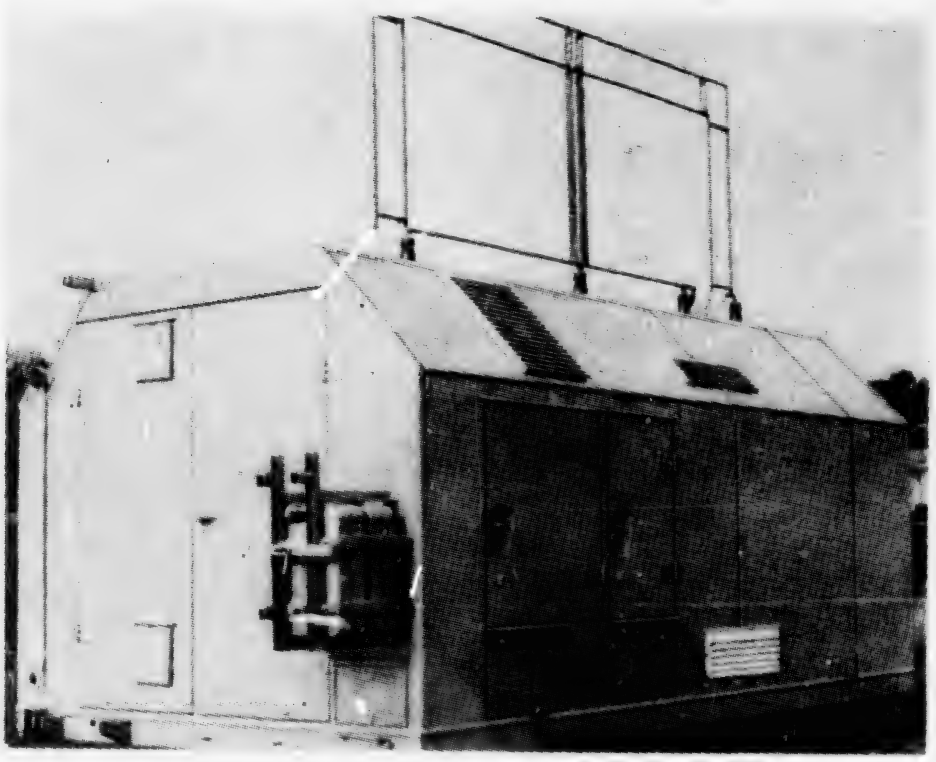

Figure 6: KFC 1300 Radio Container

High reliability and performance capabilities by automation in transport and traffic

The collaboration of the RFT communications technology with the computer technology from the VEB Combine Robotron is demonstrated through the example of a dispatcher work station for a transport enterprise. The transport and loading processes can be monitored by means of a television system.

Furthermore, it is shown that RFT transport communication, ranging from USW radio technology through intercom systems to video observation systems, offers everything that is required for the optimal management and guidance of transportation processes on water, on the road, and on rails.

Another example of efficiency increases is the RFT railway radio system, by means of which the passability of the lines can be significantly increased. The great economic utility of using RFT traffic radio technology in connection

with the police, the fire department, rescue services, taxi enterprises, etc. is so obvious and so well known that it need not be discussed here in detail.

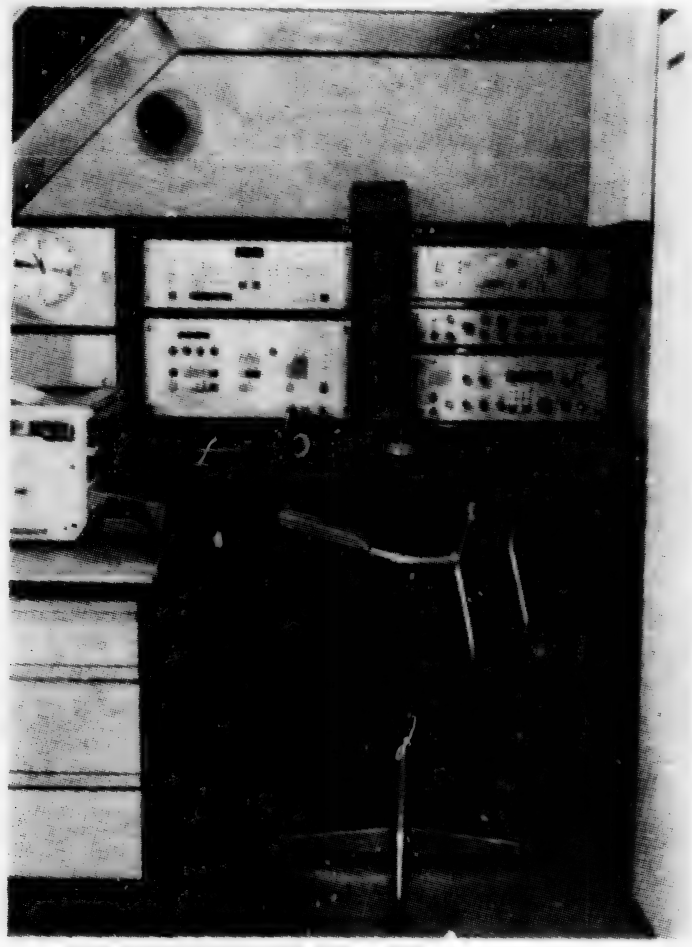

Figure 7: Radio container KFC 1300

Medical and Laboratory Technology in the Service of Health

In the health area, the devices and systems of medical electronics contribute significantly towards objectivizing diagnosis and therapy. The RFT production program comprises, among other things, devices for patient monitoring, for EKG and EEG diagnostics, as well as dialysis units. The new device generation RFT Biomonitor is also very important for intensive therapy. The devices in this system are combined through electronic patient monitoring systems, in correspondence with the respective monitoring situation. An x-ray video system is available for x-ray diagnostics. It provides the physician with maximum information from the x-ray picture and exposes the patient to an extremely low radiation stress.

The medical and laboratory technology of the VEB Combine Communications Electronics contributes decisively to the welfare of the patients and simultaneously facilitates the responsible and difficult activity of the medical personnel.

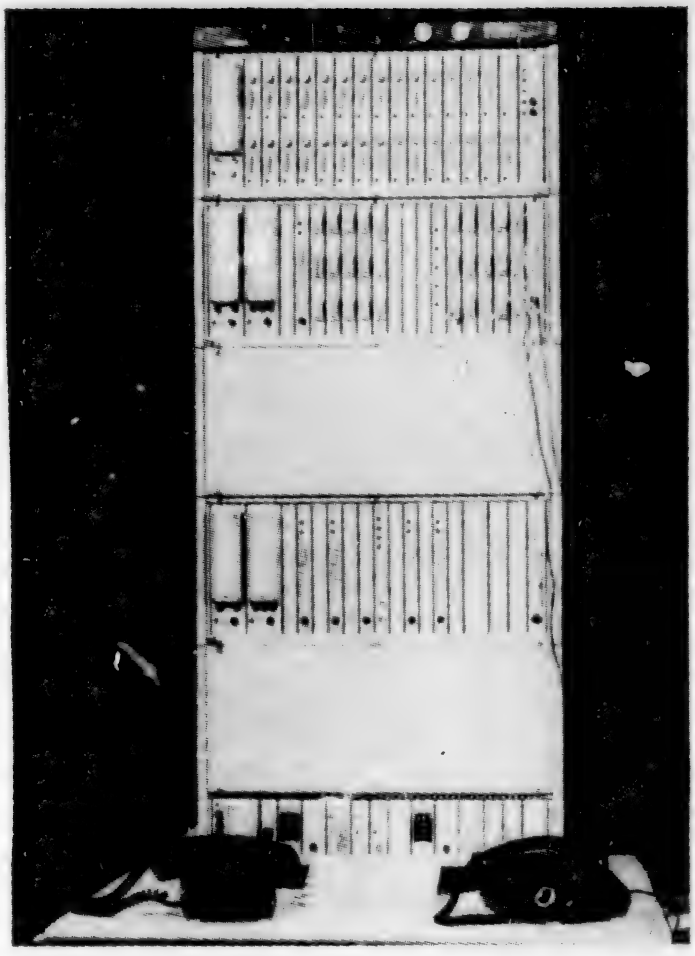

Figure 8: Digital transmission system PCM 30/PCM 120

Innovations from the VEB Combine Communications Electronics

The construction, operation, and dynamical expansion of powerful and reliable wireless and wire-bound communication networks require careful and forward-looking planning, qualified personnel, and powerful technology. In the solution of problems of network design and of the structure of communication networks, the specialists from the VEB Combine Communications Technology are professional and internationally experienced partners, whose experience is very useful to telecommunication agencies.

The managers have available an extensive supply of consulting and engineering performances as well as further innovations (e.g. licenses, technical and engineering know-how). Not least of all, the Combine will train personnel for planning, assembly, and maintenance of communication equipment as far as

a high school diploma in the German Democratic Republic and corresponding to local possibilities in the home countries of the personnel.

Novel Developments from the VEB Radio Works in Koepenick

The KBM 1300 modulation operating unit, the KBZ 1300 telephone channel B, and the KBT 1320 telephone operating unit are novel developments from the VEB Radio Works Koepenick. They are intended for use in the 1 KW short-wave transmission system KSS 1300 or for connection to the short-wave transmitter with the KCS 1400 control unit. They are used to construct a radio operator work station for commercial broadcasting, and they make it possible to connect transmitters, receivers, terminal units, lines, and supplementary units.

When all three units are deployed, telephone operation is possible on two channels, telex operation in two channels, or morse-code telegraphy in one channel.

To reduce the operating effort, the setting of the desired operational mode is linked with the selection of the transmission mode at the KBS 1300 operating transmitter.

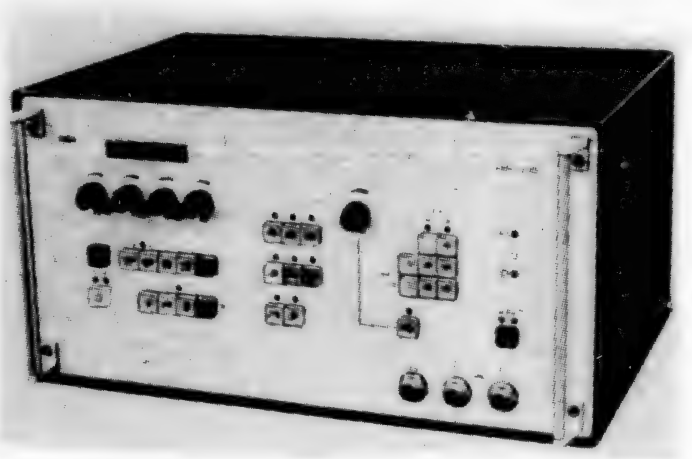

Figure: No caption

The KBM 1300 Modulation Operating Unit

The KBM 1300 modulation operating unit is designed as a desk-top unit and contains the equipment for one telephone channel (radio channel A, telephone line 1), two telex channels (radio channel A and B, telex line 2), Morse code telegraphy, and the switching through of a transient line.

These switches and controls as well as a row of LEDs as an activation indicator are provided for operation. The device has connections for the KSG 1300 transmitter or for the KCS 1400 control unit, the KBS 1300 transmitter operating unit, the EKD 100 or EKD 300 receiver, the EZ 100 supplementary receiver unit, the F 1100 telex unit, the FF 63 field telephone, or the DVG 5 or DVG 10 telephone exchange, a hand set, a hand-held or table microphone, earphones, the MG 80 Morse code transducer or Morse code key, telex lines, audio tape unit, and loudspeaker.

Telephone Channel B, KBZ 1300; KBT 1320 Telephone Operating Section

The telephone channel B, KBZ 1300, is a supplementary desk-top unit for the KBM 1300. It contains equipment for the second telephone channel (radio channel B, telephone line 2), and equipment for switching through a second transit line. It is operated through a key switch, controls, and a row of LEDs as indicators.

The unit has connections for the KSG 1300 transmitter or the KCS 1400 control unit, the EKG 100 or EKG 300 receiver, field telephone FF 63 or the DVG 5 or DVG 10 telephone exchange, an audio tape unit, loudspeaker, and the KBT 1320 telephone operating unit. This device makes it possible to freely allocate the telephone lines 1 and 2 to the telephone channels A and B. A handset, a hand-held or desk-top microphone, and earphones can be connected to the KBT 1320.

The product assortment of the stationary RFT device system U 700 consists of the transmit-receive complex, the operating complex, and the remote control equipment as well as the complex of indicator equipment. The indicator units are used to display coded identifiers and messages that are delivered by the mobile station. The identifiers are used to identify the mobile subscriber in a radio network, and the message is used for the coded transmission of special information. These are delivered automatically by the mobile station

- with call initiation and emergency call initiation
- to acknowledge a call received by the central.

Reception of an identifier with a subsequent message is acknowledged automatically by the central.

For this purpose, the following equipment is supplied on the stationary side for the transmission of identifiers and messages:

Display panel UIZ 7-1 — Display field UIZ 7-2 (desk form)
Display field UIZ 7-3 (chassis form) — Supplementary display unit UZZ 75 I.

The use of this device complex is bound to the use of the UBS 75 operating module in the mobile stations.

The display panel UIZ 7-1 is a wall-board and is used for the optical display of the operational readiness of mobile participants. The supplementary display unit can control a maximum of two panels. The panels are divided into numbered fields (panel 1, fields 00 to 49, panel 2, fields 50 to 99). These fields are associated with the mobile participants and light up when the latter are ready to operate.

The display field UIZ 7-2 and the display field UIZ 7-3 differ only as regards their external form. UIZ 7-2 is designed as a desk; UIZ 7-3 is a chassis variant, which is suitable for installation in existing systems. A UIZ 7-2 or UIZ 7-3 is controlled by the UZZ 75 I and is used to display a maximum of four identifiers with subsequent messages on four LED rows. The green seven-segment

display has a character height of 12.7 mm. Each row can be extinguished individually through an associated extinction key. When there is new information, the contents of the row migrate from the top to the bottom. Here, the extinguished lines (blanks) are written anew first before subsequent rows are influenced.

The UZZ 75 I supplementary display unit has the following functions:
- evaluation of five-digit identifiers with subsequent message
- storage of maximally four evaluated identifiers, the same identifiers are recognized and are stored only once
- storage of messages associated with the identifier
- acknowledgement of identifiers with subsequent messages.
- evaluation of emergency calls
- storage of two freely selectable messages which are used for status indicators.

By transmitting one of these messages, a maximum of 100 mobile participants can log on or log off their operating readiness. The device controls the display units that contain the following modules:

- power supply or DC voltage converter, 13.8 V
- control section 13.8 V/9 V
- switches
- audio evaluator
- acknowledgement generator
- evaluation logic
- LED control of the display unit
- panel control

Inasmuch as considerations of design and operation do not prevent it, the devices are housed in suitable box-housings of the EGS system. Corresponding to the user-specific planning and the local contingencies, the housings can be assembled in stacks or next to one another to form functional groups.

CCD Line-Sequence Camera ZFK 1020

With the development and production of a video camera generation with CCD picture recording sensors in the VEB Studio Technology Berlin, a portion of the picture acquisition and detection system is implemented.

Applications are connected with many different technological processes. The basic working steps are measurement, testing, and identifying.

The line-sequence video camera ZFK 1020 is the basic component of a modular picture detection system. It consists of the camera head and of a printed circuit board insert (control board) in the K 1520 format. It can thus be coupled directly to the K 1520 computer from the VEB Combine Robotron. Adaptation to other computers with B-bit processes is possible in principle. The control printed circuit board is controlled directly from the central computer unit (ZRE). A multi-strand cable, up to 20 m long, conducts the control pulses to the camera head. The camera head yields synchronous pulses as well as analog video signals, which again are conducted to the controlling printed circuit board. For further processing, command and control signals are available as well as a binary and analog video signal.

The line-sequence camera is useful for the monitoring of continuous production processes, for picture and character recognition under industrial conditions, and for static measurements (length and width measurements, cross-section and profile studies). It can be used in a wide spectrum of different technological processes:

- construction of machine tools
- measurement of workpieces
- quality determination
- recognition of tools and workpieces
- robot technology
- supplementary assembly
- automatic picture evaluation
- system control, especially in the basic materials industry

Direct examples of applications are the following:

- measurement of steel rods and bars; profile determination
- width measurements of paper strips
- determination of the number of objects
- utilization of the heavy shadow to determine diameter (wire diameters)
- recognition of colored objects (color filters) or objects with specific grey values
- measurement of the size of surfaces
- positional determination of objects with appropriate speeds
- determination of energy-radiating objects (heat-picture detection)
- one-, two-, and three-dimensional applications by using several CCD line-sequence cameras
- length measurements over greater distances (two cameras)
- facsimile scanning (picture telegraphy)

By using picture detection systems, technological processes which previously were associated with a great expenditure of working time and working effort can now be automated, the quality of the product can be increased, and thus very high efficiency effects can be achieved.

TFK 1010 Video Camera

The TFK 1010 video camera is a universally applicable black and white video camera. It is integrated into the remote observation system from the VEB Studio Technology in Berlin.

Modern circuitry guarantees an optimized scope of use value for the users. This is especially guaranteed by its high light sensitivity and great reliability. The application possibilities of various picture recording tubes of the Vidicon type with 300 mA and 95 mA heaters, optional equipment with fixed focus and vario-lenses with and without automatic diaphragms, make possible flexible adaptation to various applications.

A housing of aluminum pressure casting gives the camera a modern design and reliable protection under rough use conditions. Automatic control of light sensitivity and automatic circuits for important operating parameters make it possible for the user to operate this camera effortlessly.

Technical Data

video standard	625 lines, 50 half pictures, line jump 2:1 or 525 lines, 60 half pictures, line jump 2:1
synchronization	synchronized to the line or to an outside signal through S/BAS signal
minimum illumination intensity on the picture taking layer	Endikon F 2.5 M 3 A 1.5 Lx Endikon F 2.5 M 5 A 0.15 Lx
output signal	U = 1 V at 75 ohms white-positive, unsymmetric
power supply	220 - 110 V $\pm$ 10%, 50-60 Hz $\pm$ 2 Hz
power consumption	25 VA
weight	$\leq$ 3.2 kg
dimensions	length 305 mm, width 140 mm, height 98 mm

Electronization of the ATZ 65 (OAE) - Electronic Receiving Block

The automatic telephone central ATZ 65 from the VEB Combine Communications Electronics is now offered with an electronic receiving block which guarantees still higher operating reliability.

The objective of electronization was to displace the flat relay 48 by modern microelectronic components while simultaneously increasing the operating reliability. For this, the following relay-intensive modules first of all suggested themselves: receiving set connector (ESV) and receiving set (ES).

The structural design was chosen so that all components can be housed on printed circuit boards size 180 mm x 240 mm. All printed circuit boards can be plugged into a trough. They are arranged so as to be divided into three main subassemblies namely power supply, receiving set connector, and receiving set. The arrangement of individual printed circuit boards in the trough is shown in Figures 1 and 2.

The VEB Microelectronic "Karl Marx", Erfurt, and the telecommunications works Arnstadt jointly developed the special customer switching circuit U 809 M. This made it possible to house the required electronics in the tightest space. The U 809 M circuit is housed in a QIL housing with 48 pins and is designed in PMOS technology. It has its own clock pulse generator (40 KHz). In this way, receiving sets can make do without an external time-pulse supply.

In the unoccupied state, only those components have voltage applied to them which are absolutely required for the occupation process. By using CMOS circuits, the power consumption could altogether be reduced to a minimum.

The receiving blocks of the various connector racks contain a uniform power supply, in which a supply voltage of 13 V for the electronic subassemblies is generated from the operating dc voltage of 60 V.

The supply voltage is constantly monitored for adherence within prescribed tolerances. If the supply voltage exceeds 14 V, an immediate switch-off occurs to protect the CMOS circuits. If the supply voltage falls below 12 V, possible misdialings are prevented by switching the entire connection rack so that it cannot be occupied. When tolerances are exceeded, this initiates signal class 1.

The plug-in points at the printed circuit boards are essentially protected against low-ohm ground or operating potential. The a/b strands of the receiving sets have protective circuits, which make it possible to couple in a surge voltage of 1.5 kV, wave shape 10/700 µs positive or negative with respect to ground, without components being destroyed thereby. These protective circuits furthermore are dimensioned in such a way that, when a line voltage is applied, individual components will indeed fail, but there will be no consequent damages, much less will a fire break out in the exchange.

On the basis of existing positive operating experience, an expansion of this incipient electronification is also intended for the devices associated with extension stations. The customer circuits used in the receiving set were designed so that they can also be used for extension stations.

Brief Notices

Computer-supported testing and analyzing device system PAGE from the VEB Combine Communication Electronics

The fabrication, assembly, start-up, and maintenance of communication systems require manifold testing processes of various types. These can be performed quickly, reliably, and efficiently by means of the computer-supported testing and analyzing device system PAGE. The autonomous control device is a universal control and analytical computer (USAR) (Figures 1 and 2). In conjunction with a supplementary device which corresponds to the particular task at hand, it takes over the required tests and records the test result. The user has available an extensive packet of service and auxiliary programs.

Medical and laboratory technology in the service of health

The equipment from the VEB Combine Communication Electronics at the 1984 Leipzig Spring Fair also comprises devices and systems of medical electronics, which contribute significantly to the objectivication of diagnosis and therapy, and which have become an indispensible aid in the hand of the physician.

For cardiac-vascular diagnosis and therapy, the RFT three-channel electrocardiograph BIOSET 3000 (Figure 3), the RFT biomonitor system BMT II, the ultrasonic diagnostic devices and cardiac pacemakers were exhibited and, for encephalographic diagnosis, the RFT-8/10-channel electroencephalograph BST 2100.

Furthermore, the birth monitoring system "Natalie" for gynecological and birthing diagnostics were exhibited, as well as the RFT x-ray video system RFA 4010 for x-ray and radiological diagnosis.

The medical and laboratory technology from the combines Communications Electronics, Robotronics, Carl Zeiss Jena, and TuR mutually supplement one another to form a technically mature, powerful and reliable system of apparatus and equipment, which serves the welfare of the patient and which simultaneously facilitates the responsible and difficult activity of the medical personnel.

Electronic illumination clock EXAKT

The electronic illumination clock EXAKT (Figure 4) is intended for work in a photographic laboratory. All commercial enlarging units up to 1000 W can be connected. By means of this electronic illumination clock, one can set times between 0.1 s and 8.1 min. The adjustable times are stepped with the factor 1.21.

The use of electronic components guarantees high precision and reliability.

Technical data

type of current	AC 50 to 60 Hz
voltage	220 V
power consumption	(without load) maximum 2 W
fuses	fine fuses 6.3 A slow
load	max 1000 W incandescent lamp
adjustment accuracy	$\pm$ 5 percent
reproducibility	$\pm$ 1 percent
temperature range	5 to 35 deg C
dimensions	max 150 mm x 80 mm x 130 mm
weight	0.5 kg

New construction enterprises for communication systems

The VEB Construction and Communications Systems was formed from the Leipzig and Dresden construction enterprise for telecommunication systems. It began production at the beginning of the year. This concentrates the production and training sites of the RFT communications engineers and assemblers. The seat of the new management is Leipzig.

The task of the VEB Construction and Communications Systems is to take care of communication facilities on major mining equipment, and to take care of electroacoustics in passenger train cars and in cultural structures such as the Semper Opera in Dresden. Furthermore, it is equipping the Rapid Medical Assistants with RFT technology and is equipping the trolley cars with USW radio. The enterprise also fabricates, among other things, devices for studio technology and mixing desks. The general vendor of the combine Communications Electronics, the VEB Construction of Radio and Telecommunication Systems, Berlin, will continue to remain the partner for foreign customers.

Pocket receivers

The pocket receiver G1000 (Figure 5) is a single-chip radio. The device is equipped with a ferrite antenna and receives transmission in the medium wave range from 520 to 1605 KHz. Its above-average sensitivity and its good separation are achieved by using modern components. Good reception is guaranteed even in unfavorable locations. Its small dimensions (69 mm x 165 mm x 27 mm), its low weight of only 209 g including batteries, the possibility of single-handed adjustment of volume and tuning, as well as its earphone connection, secure a high utility for the pocket receiver. The device has a 150 MW loudspeaker. It consists of two hemispheres which are equipped with a snap-lock.

Loudspeaker boxes for many applications

Loudspeaker boxes from the VEB Combine Communications Electronics also satisfy the most stringent demands.

The loudspeaker box B 9281 is a hifi three-way box for the high grade reproduction of music and speech, preferably as a component of electroacoustic home systems with hifi quality. The closed housing, which is covered with a damping material, houses not only the loudspeakers, but also an electric frequency switch which devides the frequency range being transmitted among the loudspeakers for base, midrange, and high-frequency reproduction.

The loudspeaker box B 4101 is a one-way box with an interior volume of 4 1. It works according to the base reflex principle. This high grade loudspeaker guarantees reproduction of low and high tones in good quality.

The compact ball-boxes Uni 15/Uni 10 are the ideal loudspeaker system for the auto and the home. The loudspeakers are housed in black 0.7 1 plastic housings. Special technologies in the conversion of electromagnetic information into acoustic vibrations guarantee excellent reproduction qualities (Figure 6).

New mixing desk generation for audio studios and public address systems

A generation of mixing desks was developed for the construction of studio installations and public address systems. The manifold combination possibilities of the devices are capable of sound production in mono and stereo.

The studio mixing desk MP 4084 can be used stationary to equip studios for audio recording and rerecording, in stationary audio control systems for public address purposes in cultural buildings, in commercial radio studios, as well to extend audio control systems, e.g. for the mixing of multi-track recordings. In the mobile area, small and medium transmission cars can be equipped with the MP 4084, control equipment in larger transmission vehicles can be supplemented, mobile studios and mobile control equipment for halls can be equipped for music electronics.

The mixing desk MP 4084 si a stereo audio control system. It has eight input channels and, by means of five separate expansion panels, it can be extended to 40 input channels according to the modular principle. Eight channels are

additionally available as group controls and four channels as sum controls.

The ministudio unit KSG 244 and the minimixing desk KM 42 are intended for medium and small audio studios. These mixing desks form one device family with the MP 4084.

The ministudio device KSG 244 is suited for stationary as well as for mobile use. The basic unit is equipped for eight input and four sum channels. With a maximum of two expansion units, it is possible to use 24 input channels.

The portable minimixing desk KM 42 can likewise be used stationary or mobile. It contains four input and two sum channels.

The devices of the new generation of mixing desks have one filter associated with each input channel - for treble, base, and presence. Liberal use of external units for each input channel is guaranteed. A balance control for stereo is also present. The input sensitivity is adjustable from -70 to + 20 dBm.

8348
CSO:2302/34

LECTURES AT 1984 LEIPZIG SPRING FAIR: ABSTRACTS

East Berlin NACHRICHTENTECHNIK-ELEKTRONIK in German Vol 34 No 3, 1984 pp 91-93

[Text] The VEB Combine Communications Electronics traditionally participates in technical meetings on current topics at the scientific-technical program in connection with the 1984 Leipzig Spring Fair.

The program includes the following lectures:

1. Complex communication systems for the manifold needs of world-wide communication from the VEB Combine Communications Electronics.

2. A broad supply of scientific-technical performances from the VEB Communications Electronics.

3. RFT fiber-optic waveguide systems and RFT transmission systems for digital message transmission.

4. Application aspects of digital devices and systems from the VEB Combine Communication Electronics

5. Making the organization of working processes more efficient by complex communication systems from the combines Communication Electronics and Robotron

6. RFT picture recognition systems for automation technology

7. RFT audio studio technology for cultural buildings, radio, and television

8. Radio engineering from the VEB Combine Communication Electronics

9. Digital directional radio-link system PCM 120-2000

10. Application examples of the system of integrated circuit arrangements (ISA) in communication electronics

11. Data transmission with digital directional radio links

12. Computer-controlled material administration in production areas

Abstracts of the Lectures

H. Barthelmess, VEB Combine Communications Electronics

Complex communications systems for the manifold needs of worldwide communication from the VEB Combine Communications Electronics

The services offered by the communications industry of the GDR comprise all activities which are associated with the planning and designing of communication networks, the delivery, assembly, and industrial acceptance of communication equipment, and the training of operating personnel. The VEB Combine Communications Electronics communicates knowhow to its partners, assigns licenses, and renders aid in taking up production of communication products in the country of its partners. The assortment of devices is also suitable for opening up communications in economically less developed regions.

Its offering includes RFT ground-based telephony, a digital local central for 100 subscriber connections, and the proven UHF/VHF radio telephone system for the telecommunication supply of small and medium network groups in country areas.

Furthermore, PCM directional radio link equipment and PCM transmission systems are offered for 30, 120, and 480 channels. Low frequency cables can also be included in the PCM network. Transmission via fiber-optic waveguides deserves special attention. This holds hope for transmission systems and for subscriber connection to the fiber-optic waveguides. The telegraphy transmission system SZT can execute telegraphy and data traffic for writing speeds of 50 to 300 Bd with the PCM transmission technology.

The VEB Combine Communications Electronics also manufactures terminal units, miniaturized telephone equipment with touchtone dialing, and memories for telexes. All products are produced with modern components according to the most recent technologies.

D. Leistner, Institute for Communication Technology

A broad supply of scientific-technical services from the VEB Combine Communications Electronics

The high and steadily rising tempo of development of science and technology and the increasing breadth and linkage of individual disciplines leads to growing specialization and naturally requires a higher and higher degree of

cooperation as well as the exchange of new scientific-technical information. An expression of this, in one instance, is the nearly exponentially growing number of scientific-technical publications and, in another instance, also is the steadily rising paid-for exchange of scientific-technical results.

The trade of knowhow, licenses, and other results of research and development, including the export of education, has rapidly grown worldwide during the last years and decades. Its proportion in the overall world trade, both absolute and relative, has steadily increased, even though the USA and several other capitalistic states have recently engaged in a restrictive policy precisely in this area with respect to socialist countries and a series of young national states. Commerce with scientific-technical results (WTE) has great significance both for the general speedup of technical progress and also especially for the economic development of countries with as yet have a low potential in this area. At least to the same extent as the delivery of production equipment and systems, this exchange contributes towards overcoming an economic lag and raising step-by-step the economic, technical, and social level of such countries.

Furthermore, a policy of foreign trade balance in this area is a direct expression of the high state of research and development which the respective country has achieved.

The German Democratic Republic is performing active work in this area, which is also supported by contributions from the combine Communications Electronics. This is in accord with its general foreign-trade objective, documented by the motto "For open world trade and technical progress", on which the Leipzig fairs are based. The GDR offers interested parties from all countries a broad supply of scientific-technical results, education and consultation services, planning aids, etc. A special consultation center is available, staffed with experienced specialists.

G. Hansel, Institute for Communication Technology

RFT fiber-optic waveguide systems and RFT transmission systems for the digital transmission of messages

Digital transmission systems offer a future-oriented solution for the construction of communication networks and for the expansion of already existing networks. Such systems comprise the best presuppositions for the addition of new services and for the step-by-step transition to the future integrated services digital network (ISDN).

To be able to meet various use conditions in an efficient manner, a system family was created whose structure rests on the basic system PCM 30 and further hierarchical stages. The expandability of existing lines is discussed in terms of the technical main features of equipment for the line tracks PCM 30, PCM 120, and PCM 480. Economically advantageous solutions for extending the number of transmission channels can be implemented.

It is especially important for the user that not only metallic conductors but also line equipment for fiber-optic waveguide transmission is being offered for the digital transmission systems. The special characteristics of the fiber-optic waveguides opens further application possibilities for digital transmission and for the follow-on equipment of heavy-use lines. The technical characteristics available with fiber-optic waveguide systems are treated.

Directional radio links are a third transmission medium, in addition to those mentioned above; PCM transmission equipment has also been created for this purpose and thus expands the flexibility of network design.

Using PCM basic systems as an example, it is elucidated how, in the course of further developments, the increasing introduction of microelectronic solutions improves the most important utility characteristics.

C. Hirsch, VEB RFT Telecommunications Works, Leipzig

Application aspects of digital devices and systems from the VEB Combine Communications Electronics

Communications technology is engaged in a change-over from analog technology to digital technology. The combine Communications Electronics has long traditions in the area of digital technology (e.g. with the PCM transmission system). It is now introducing digital equipment for further applications into production.

Application possibilities are presented for two new products from the VEB RFT Telecommunications Works Leipzig: The telegraphy and data multiplex equipment SZT combines the 46 50-baud channels or the 7 300-baud channels which are required for transmission on a telephone channel (fulfilling CCITT requirements) into one 2.4 kbit/s current. Besides the main application area in the telegraphy transmission network of the postal administration, other applications are the multiple utilization of existing telephone routes in the construction of data networks with speeds up to 300 bit/s. Thus it is possible, in the initial phase of the construction of data networks, to connect the data subscribers to a central over longer distances. Thus, even with a relatively low data subscriber density, centrals with greater capacity can be constructed and can be economically loaded.

The second exhibited unit is a digital communication central for a maximum of 96 subscribers. Application areas of this central are subscriber areas in country regions as well as developing countries. This high-grade local central offers a large number of new services which can be selected in accord with the respective application. In connection with land-based telephony systems as well as the PCM 10 radio link transmission system, networks can be set up for component areas of regions where little communication equipment as yet exists, e.g. in developing countries.

Other types of application areas are the use as concentrator in unmanned operation, in skyscrapers or also in old buildings, as well as in containers to satisfy occasional telephone needs in the case of catastrophes or gatherings.

Here, the concentrator effect achieves a good utilization of the connecting cables. Another novel application is its operation as an exchange with certain extension-central properties by collecting together several mini-extension networks. This operation can be implemented technically and legally within the framework of an association of users. This operating mode becomes possible because the OZ 100 D can store all conversation fees individually for the subscribers and can print them out monthly or upon special demand on a connectible telex unit.

K. Thielecke, Institute for Communication Technology

Making the organization of working processes more efficient by complex communication systems from the combines Communications Electronics and Robotron

For nearly a century, the devices of communication-, office-, and computer-technology have been indispensible aids in the execution of business procedures. Limited conjunctions, e.g. of writing and communication technology to produce telex units, have already led to new qualities in communication technology. However, only in recent decades, by using novel theories (e.g. information theory) and by applying important inventions (e.g. the transistor and its technical further developments to highly integrated circuits) could the above-mentioned technical complexes be transformed from electromechanics or mechanics to electronics. Thus, the technical-engineering preconditions matured for the economically necessary functional interlinkage of operational communication processes based on a uniform signal representation of information in the form of speech, text, data, and picture displays. Information processing, storage, and transmission must be efficiently implemented in an intra-operational connecting system, and such systems must be coupled through public communication networks. These are current objectives. Their relevance lies not only in the fact that the previously stagnating productivity increase in the office area can thus be overcome.[1] Likewise, with the multiplicity and increasing complexity of business processes, the current information status and the transparency of business events are indispensible for the management cadres in the making of decisions and evaluations. Effective office communication acts both towards the inside and towards the outside. It is thus also influenced by internal and external technical and organizational conditions. In the interaction of industries concerned with communications technology, computers, cables, and microelectronics, process-oriented basic solutions were worked out for the manifold problems of office activities. These solutions will contribute significantly towards improving the efficiency of the enterprise.

One concern is to make more efficient the strongly operative activity of the dispatcher in the transport business by suitable communication equipment. The operational telephone network, coupled with a public network, is very important here, now as before. To organize the working processes, e.g. the loading

[1] The terms office area and office activity should serve as synonyms for the tasks of managing, planning, and accounting of the processes and administration of any objects, and should include the control of business processes, from production planning to sales.

and unloading of transportation means, to plan the timely furnishing of the necessary conveyance means, and to optimize transport, direct access to a data processing system must also be guaranteed, however. Data radio equipment can also manage data acquisition at mobile objects on site. Voice radio is an essential means of speech communication with the loading columns and operators of the conveyance means. The specifics of this dispatch activity furthermore require a remote observation technique to monitor the operating sequences.

With this comprehensive communication technology, it is essential that suitable means guarantee easy operability.

H. Schonert, VEB Studio Technology Berlin

RFT picture recognition systems for automation technology

Due to the rapidly advancing automation of various technological processes in the national economy, especially in conjunction with handling systems optoelectronic sensors for microcomputer-controlled picture recognition systems are becoming more important.

For this purpose, a conception for the development of a comprehensive modular picture recognition system was worked out in the VEB Studio Technology Berlin, in collaboration with scientific institutions of the GDR. TV cameras with line-sequential and surface-scanning sensors can be connected to this system, to recover and process signals from binary and half-tone pictures with rapid staticizing and storage of data. They are controlled by the microcomputer K1520 from the VEB Combine Robotron.

The CCD line-sequential camera ZFK 1020 is being presented as the first module from this system. Its functional group as well as chosen conceptions including the technical data are elucidated, taking into account its special requirements. Starting from the derivation of the signal from optoelectronic sensors (including the lens), proceeding then to the signal preparation and processing, and finally including transfer of the data to the computer, its functional processes are described. Reference is made to problems which can arise in connection with illumination equipment and limits are estimated.

Results obtained with the ZFK 1020 are reported, as regards the parameters, sensitivity, dynamic range, resolution, etc. By means of a block circuit diagram, it is shown how the ZFK 1020 can be part of a modular picture recognition system.

D. Lemke, VEB Construction of Communications Systems, Leipzig

RFT audio studio technology for cultural buildings, radio, and television

Electroacoustic systems are today an indispensible component of the technical equipment of hospitals, schools, sport and leisure facilities, businesses, theaters, concert halls, etc. Important application areas of audio studio technology in the commercial area are radio and television studios as well as recording and film synchronization studios. The RFT audio studio technology

with its integral device conception and universal applicability, is excellently suited for all applications.

The systems of the RFT audio studio technology have the following basic structure:

The centerpiece of the studio system is the mixing desk, which is preceeded by the commutation of the input path. On the output side, the audio paths of the mixing desk likewise lead to a commutation. In the case of public address systems, the power amplifiers are connected here; in the case of production studios, the lines to the recording units are connected here.

The commutations of the input and output paths are housed in standardized racks which yield the desired distribution possibilities by being ordered in sequence. The device family of the mixing desk MP 4084 with its reduced variants KSG 244 and KM 82 are used as mixing desks. Control racks for the power supplies or for receiving the public address systems for communication purposes complete the system concept. Corresponding to the requirements of the particular application, microphone equipment, power amplifier racks, as well as the associated loud speakers are designed into the system. All system components have a structure that is convenient for assembly and are connected through solder distributing points or through plug connectors. The structure, start-up, calibration, and hand-over of the system, the qualification of the user, and service are all included in the scope of the delivery.

The modern audio studio technology must

- reproduce the natural tone image without any falsification
- avoid undesirable acoustic level fluctuations and feedback
- coordinate the acoustic sound image with the optical directional impression
- artificially create sound image effects.

These requirements are comprehensively fulfilled by the RFT audio studio technology. Through a reliable construction, easy operability, as well as through quality parameters which correspond to the studio standards of the GDR, it meets even the most stringent requirements.

F. Lang, VEB Radio Works, Koepenick

Radio technology from the VEB Combine Communications Electronics

The point-to-point connection is the radio system which dominates in commercial short-wave technology. These radio systems can be built up with the commercial short-wave technology from the VEB Combine Communications Electronics.

The point-to-point connection is the basic component for single-channel and multi-channel networks. Single-channel networks are known as star networks, area networks, and relay networks. The functions of the single-channel

networks are elucidated, and reference is made to possibilities of implementing them with products from the VEB Combine Communications Electronics. Multichannel networks are the line network, which is used in the train-radio system from the VEB Combine Communication Electronics, and the bundle networks. The stationary bundle network is suitable for use in ground-based telephony.

The radio technology can be used not only in the previous, largely autonomous radio systems but also for the transmission of message bundles. Classical examples are multichannel telegraphy and telephony with the short-wave technique. A new radio system for this purpose is the USW feeder URC.

K. Schmidt, VEB Robotron Electronics Radeberg

Digital radio-link system PCM 120-2000

Modern communication technology in all areas is showing a clear trend towards digitalization. Accordingly, the PCM radio-link systems are also being developed and produced in the VEB Robotron Electronics, Radeberg. This equipment is designed in the narrow-rack construction mode and in the technology of the third generation.

The radio-link system 120-2000 makes possible the transmission of digital information with a bit rate of 8.448 Mbit/s, corresponding to 120 telephone channels, in the frequency range 1.9...2.1 GHz by means of an RF channel grid according to CCIR Draft-Rec. 283-3. In addition, a relay-point service channel is available for transmitting service conversations and signals from the automatic equipment. The radio-link system can be connected together with any secondary multiplex equipment which has interface paramenters according to CCITT Rec. G 703.

I. Krahl, Institute for Communications Technology

Application examples of the system of integrated switching arrangements (ISA) in communication electronics

By way of introduction, the international development of devices of communications electronics is estimated as regards the use of modern microelectronic components. The use of digital technology in communication and transmission technology is increasing with the further development of microelectronics. The use of custom-specific circuits with very small numbers of units and message-specific standard circuits with large numbers of units here represent the main trends. The key economic question - low cost for custom-specific circuits with a very small number of units - can be solved by the master slice systems.

After a brief survey of the trends in the international market, the bipolar ISA system and the I^2L-ISA system of the VEB Semiconductor Plant Frankfurt (Oser) is discussed. The necessity of using the ISA technology for the GDR communication electronics is substantiated. It is pointed out that, in the GDR, specific ISA applications are processed in the transmission, communication, and radio technology. For this purpose, a design center was built up in the combine Communication Electronics.

Using the PCM 30 regenerator in analog-bipolar-ISA and a three-place LCD driver circuit in I^2L as examples, the basic design process and the work division between the semiconductor industry and communication electronics is indicated for both ISA techniques. With the use of ISA switching circuits, considerably improved properties can be achieved for new devices. The OZ 100D is an example of this.

In summary, it is stated:

- The VEB Combine Communication Electronics will now and in the future increasingly use ISA customer circuits.
- The design center in the combine Communication Electronics, together with the semiconductor manufacturer HFO, offers its knowhow and its design capacity to foreign firms.

E. Rempt, VEB Robotron Electronics, Radeberg

Data transmission with digital radio-link systems

Digital radio-link systems are especially well suited for effective data transmission due to their time-multiplex transmission procedure. A precondition for this is that the channel converters which belong to the overall system have available appropriate entry technology. Using the digital radio-link system PCM 10-400/800 as an example, this technique and the resultant applications are treated.

The system works in the radio frequency range of 400 or 800 MHz. The ten 64-kbit/s channels are collected together through a multiplexer belonging to the system to form a PCM pulse frame with 11 time channels and a bit rate of 704 kbit/s. Through the decentralized coding of the telephone signals with single-channel code, it is possible to equip each channel card slot optionally with seven different channel cards (four for telephone and three for 64-kbit/s data transmission). The telephone channels are suited for conventional data transmission with modems. Furthermore, a direct digital entry of data signals into the PCM time channels is possible by means of system-internal matching modules. There are connection possibilities not only for 64 kbit/s but also for all bit rates recommended by CCITT, between 50 bit/s and 48 kbit/s.

Standardized interfaces for data terminal devices (DEE) are offered both according to V.24 and also according to X.24. The DEEs can here be set up by a 0.8 km (with GDN 64 up to 10 km) from the radio-link station.

The PCM 10-400/800 system is intended for the construction of computer networks, special data networks with standard connections, and for use in relayed digital data networks of arbitrary type, as well as to implement subscriber connections and connection channels.

8348
CSO:2302/34

FAST ARITHMETIC FOR MICROCOMPUTERS

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 32 No 8, 1983 pp 487-490 and Vol 32 No 9, 1983 pp 596-598

[Article by Frank Markert, engineer; Announcement from Information Technology Division, Karl-Marx-Stadt Technical College]

[Abstract] For many tasks the processing speed of microcomputers is insufficient for arithmetic operations. For picture processing tasks simple arithmetic operations are often needed which have to be applied to a large data base. In the manipulation of geometric objects, the geometric operations must be applied to all significant object data in sequence. The frequent requirement for real-time processing cannot be satisfied by simple software implementation. A hardware upgrade and implementation of selected arithmetic operations can be a remedy here.

The K 1520 microcomputer suffers from the above disadvantages, but a multiplier is described which can perform simple and more complex arithmetic and trigonometric operations. This multiplier is linked to the system bus via memory mapping. The computing unit is the core of the multiplier and it consists of a 16-bit parallel arithmetic-logic unit composed of four ALUs 74181 (K155 ИП II3) and pertinent lock-ahead-carry generator 74182 (K155 ИП II4). 16-bit addition is possible within 64 ns. The arithmetic algorithm is described.

With this unit arithmetic processing times reduced by 10 to 100 times are possible for certain tasks. But the equipment is expensive, uses considerable energy and takes up considerable space. These capabilities represent an interim solution until more powerful arithmetic processors become available.

References

[1] Kieser, H., Meder, M.: Mikroprozessortechnik (Microprocessor Engineering). Berlin: VEB Verlag Technik 1982.

[2] Dorn, L.: Mathematics Coprocessor: One Hundred Times Faster Than Software. Electronics. New York 54 (1981) 24, pp 57-61.

[3] Reinsch, C.: The INTEL 8087 Arithmetic Processor: A complete implementation of the proposed IEEE Standard for floating point arithmetic. Elektronische Rechenanlagen, Munhc 23 (1981), 4 pp 173-178.

[4] Theile, T.: Digital Function Value Generator for the K 1520 Microcomputer System. Dissertation, Information Eng. Dept., Tech. Univ. Karl-Marx-Stadt 1981.

9280
CSO: 2302/63

ELECTRONICS COMPONENT R&D, PRODUCTION CAPABILITY REVIEWED

East Berlin SPECTRUM in German Vol 15 No 9, 1984 pp 9-10

[Article by Prof Dr Hans-Friedrich Hadamovsky, GDR Academy of Sciences Central Institute for Electron Physics]

> [Text] Scientists of our academy are able to present outstanding achievements for the birthday of the Republic. One of these originates from the Central Institute for Electron Physics: The Schottky diode. The efficiency of combinatorial circuit parts is doubled by its use. A second achievement relates to the high-pressure research at the Central Institute for Geophysics. By coupling electronic temperature and pressure control programs it was possible, for instance, to attain the synthesis of materials.

Six years ago the Central Institute for Electron Physics of the Academy of Sciences was assigned the task of supporting the technological development of the enterprises in the VEB Combine Microelectronics by diagnostic tasks to be performed within the framework of the microelectronic program. This was done with considerable expense and great efforts on the part of our collectives. However, these efforts remained unsuccessful. On the one hand, the enterprises showed little inclination to change the technologies according to our instructions because of the economic risks involved and on the other hand, the capacity of our coworkers to understand the technological problems of large-scale production was not yet sufficiently developed.

We now had the idea of conducting our own research on components which was to proceed all the way to the working out of new basic technologies. The objective was to establish the chain "basic research-process development-technology-test production" with the utilization of all diagnostic possibilities, including the reliability measuring techniques. Prior to reaching this point, however, the following four prerequisites had to be created:

> The selection of such a component with new technology, for which in perspective an economic demand exists and which is scheduled on the long term for the production program of a plant;

the formation of an interdisciplinary collective ready to devote its energies with elan to this new task for the academy;

the establishment of a technical college conforming with its facilities and technological possibilities to the advanced international state;

the advancement of research work to a point where production in the laboratory is possible after manufacture of the prototype, making it possible to accelerate a transfer to production at the industrial partner.

Previously, all semiconductor devices in the GDR were produced for power electronics in the bipolar technology. We determined from a study, however, that there is an international trend toward the application of unipolar diodes, the Schottky diodes. This is due to the increasing use of the microelectronics and the application of the so-called combinatorial circuit parts in the appliance industry. Combinatorial circuit parts serve the current supply, for instance in EDP equipment, robots, telecommunication units and medical devices equipped with integrated circuits, preferably with microprocessors. The power supply units are fed from a.c. or d.c. mains of varying voltages and are to supply with galvanic separation between in- and output a stabilized d.c. voltage of 2...15V with a several hundred watt power output. The conventional combinatorial circuit parts used to date worked only with an efficiency of between 30 and 40 percent because on the one hand a longitudinal transistor with high power dissipation was used as a regulator for voltage control, while on the other hand high-loss power transformers of 50 c/s were employed. The economically high demand necessitated a more favorable scientific-technical solution which lies in the fact that the losses can be reduced substantially during transformation by a considerably higher frequency.

The control element is designed as a regulated switch. The potential is separated with the aid of a very small high-frequency transformer. The height of the switching frequency is determined by the HF transformer, the transistor circuit frequency, and the reverse recovery time of the rectifier diodes. Conventional bipolar transistors and fast rectifier diodes (doped with gold) limit them to about 35 kHz, whereby the efficiency leaves something to be desired. Power MOSFETs and Schottky power diodes in conjunction with suitable HF transformers make possible operating frequencies in excess of 100 kHz. This new principle permits a reduction of material expenditures for the power supply unit by the factor 4 and the raising of the equipment efficiency to more than 80 percent. In order to realize the rectification of the high-frequency alternating current with great efficiency, the diode must exhibit low forward power and blocking losses, as well as a reverse recovery time near zero. This can be realized in a diode with a Schottky barrier as the blocking layer since, with the application of a silicide layer on n-type silicon, the current flow consists only of electrons (the Schottky diode is a majority charge-carrier component). The carrier damming effect of the minority charge-carriers feared

in the pn-diodes, which delivers a considerable reverse current during switch-over from the direction of flux to the reverse direction, is absent. The type of the metal (silicide) semiconductor barrier is a decisive factor in the determination of the forward- and blocking capacity of the rectifier arrangement. Only a few years ago it was discovered that the silicides of the transition metals (Cr, Mo, Pt) with barriers ranging from 0.57 to 0.88 eV permit low forward voltages (about 300 mV lower than in the pn-diodes) and peak reverse voltages of between 40 and 70 V, depending on the barrier metal used.

The Central Institute for Electron Physics was assigned the task of developing within a short period by way of contract research with the VEB Combine Microelectronics, and by using exclusively materials and equipment from domestic sources, a basic technology for the manufacture of chips, and of making available the basic type of a new family of components with participation of the industrial partner.

We concluded the first stage of our research work last year. Having conducted reliable tests on several thousand chips and components, we presented a new basic technology for the diode type platinum barrier presently holding the lead in the world. The new component (it received meanwhile the type designation SY 525) is superior to leading international types especially in its reverse current conduct. We introduced it immediately to the users. More than ten enterprises reported immediately that they had considerable requirements. The demand will be met by a newly organized cooperative chain comprising the VEB Mikroelektronik "Karl Liebknecht" Stahnsdorf, the VEB Mikroelektronik "Robert Harnau" Grossraschen, and the Central Institute for Electron Physics. Our college of technology took over the manufacture of the chips.

In preparation for the 35th anniversary of the GDR our collective made a commitment to satisfy the requirements by an additional laboratory production with a value exceeding half a million marks and to realize furthermore the further development and new development of a diode with low flow voltage. In 1985 we will contribute additionally to meeting the demand by laboratory production. A youth collective under the direction of Dr. Joachim Noack will take over the realization of the new type with reduced flow voltage.

The manufacture of the chips in large series is, so to speak, the moment of truth, since it will disclose mercilessly defects in the basic material, technology, and also in the work methods of the collective. In addition, the colleagues in our diagnostic department can now pull out all the stops in order to detect still existing defects. Accordingly, the laboratory production has two positive sides: We are meeting the present economic demand and we are going through a comprehensive learning process which will be of importance for future work. By the way, we have participated decisively in and partially realized a new work direction in microelectronics by our work on the diode--the application and diagnostics of the silicides for the VLSI technology.

One can say without exaggeration that we are manufacturing today with almost industrial perfection. Our completely air-conditioned and almost dust-free technical college was built with relatively modest costs by reconstructing a tract of sitting rooms. Two colleagues should be mentioned here who have rendered outstanding services: Christoph Schulze, engineer, who did the planning and directed the construction, and Rudolf Seidel (DLE Adlershof) who recognized the importance of the project from the start and lent his generous support. We wish to thank also, however, the plant manager of the VEB Microelectronics Stahnsdorf, chief engineer Helmut Kappelhoff and Dr. Joachim Schnabel for the material support and organization of the technological cooperation. The equipment of our technical college permits us to transfer the work result directly to the production of the contractual partner for the manufacture of chips, the VEB Microelectronics "Karl Liebknecht," Stahnsdorf.

PHOTOCAPTION

The new Schottky diode, with an admissible current density (200...300 Acm^{-2}) three times greater than that of the conventional pn-diodes, attains its high effect by exact temperature treatment. The wafers are inserted carefully into a quartz magazine prior to being put into the oven (the lower picture shows the Schottky diode in natural size).

12693
CSO: 2302/38

CONSTRUCTION, TESTING OF 1-MW NITROGEN LASER

East Berlin FEINGERATETECHNIK in German Vol 33 No 5, 1984 pp 204-206

[Article by R. Weidauer, A. Glismann, Dr R. Konig, Dr H. Falk, GDR Academy of Sciences Central Institute for Optics and Spectroscopy]

[Abstract] Nitrogen lasers (N_2-lasers) have achieved considerable importance since their discovery in 1963 by Heard [1]. They are preferred as pump light sources for nanosecond pigment lasers [2] but are also used in photolysis experiments, fluorescence decay time measurements, in the determination of air pollution, the detection of oil traces or in material processing in semiconductor and microelectronics [2] [3].

The laser energy was measured by means of an absolutely calibrated, pyroelectric receiver (ZOS-developed); the pulse shape was determined by means of a fast photocell (ZOS-developed) in combination with an SU-oscilloscope I 2-7 [7]. The time resolution of the overall system was about 0.5 ns. For measurements it was important to take into account that besides the strong UV-radiation at 337.1 nm, radiation was also emitted in the near IR between about 870 nm and 900 nm [8] which corresponds to the transition B^3II_g-$A^3\Sigma_u^+$ in the 1st positive system. The IR pulse exits from the laser with about 10 ns delay to the UV-pulse; its pulse width was measured at 7 ns, whereas that of the UV-signal amounts to 12 ns under optimum conditions. The pulse shape of the UV-pulse at a pressure of 8.7 kPa is visible in figure 4. It reacts very sensitively to pressure in a range of 4 kPa to 10.7 kPa. The energy in the IR-range amounts to around 5 percent of the UV-energy. By means of a dielectric edge filter (KCZ) the IR-fraction was reduced to less than about 0.5 percent in order to prevent falsification of the values when measuring in the UV-range.

References

[1] Heard, H.G.: Ultraviolet Gas Laser at Room Temperature. Nature 200 (1963) 4907, p 667.

[2] Hertz, J., Schramm, W., Seliger, K.: "N_2-Pulse Gas Laser Applications," Informationsschrift des Zentralinstituts fuer Optik und Spektroskopie der AdW der DDR, Berlin 1973.

[3] Basting.: The Nitrogen Laser--Properties and Applications Laser u. Elektro-Optik 5 (1973) 4, p 31.

[4] Herziger, G., Theiss, F.J.: Coaxial Gas Lasers to Generate Intensive, Short Laser Pulses. Z. angew. Physik 29 (1970) 3; p 157.

[5] N_2-Laser YV 24 - Sales Documentation of Molectron Co.

[6] Lademann, J. et al.: Einfacher Excimerlaser mit automatischer Vorionisation (Simple Excimer Laser With Automatic Preionization). Exp. Techn. Physik, in print.

[7] Grunwald, R.: Investigations of the Spontaneous Emission of a Diffuse N_2-Laser Plasma. Dissertation, Univ. Berlin 1982.

[8] Kasuya, T., Lide, P.R. Jr.: Measurements on the Molecular Nitrogen Pulsed Laser. Appl. Opt. 6 (1967) p 69.

[9] Konig, R. et al.: Spectroscopy With Nanosecond Pigment Lasers. Z. Chem. 22 (1982) 8, p 288.

[10] Mory, S., Rosenfeld, A., Konig, R.: Pigment Laser Laboratory Spectrometer for Nanosecond Absorption Spectroscopy and Coherent Antistokes' Raman Scattering. Exp. Techn. Physik. In print.

9280
CSO: 2302/62

GENETIC ENGINEERING GOALS AT SZEGED BIOLOGICAL CENTER

Budapest ELET ES IRODALOM in Hungarian 7 Sep 84 p 7

[Summary] Dr Erno Duda, senior scientist of the Szeged Biological Center of the Hungarian Academy of Sciences, is working with a team on correcting hereditary defects by implanting DNS into cells to provide missing genes, activate mute genes or correct erroneous combinations. He says the long-term goals of his team are to produce vegetable and animal cells, ultimately superior animals and vegetables by introducing superior genes from other organisms or test-tube synthesized DNS sequences into the cells of organisms of a higher order. If possible, they will be introduced not only in vitro in tissue culture cells but in vivo as well.

Duda is concerned that a superior organism may result which meets goals but which reacts in an unassessable or disastrous manner with the environment. A case in point has been the unfortunate result of stocking Lake Balaton with amur fish from the USSR: the amur was supposed to control the growth of pond weed. What actually happened is not explained.

The scientist believes that man has been deteriorating genetically since becoming a civilized being: the best, most suitable, bravest and most honorable fail to propagate while the below average multiply. Another danger is that the medical profession, instead of practicing preventive medicine is concentrating on preserving the sick. Consequently, genes which would normally be eliminated through natural selection remain in circulation. At great cost, society preserves humans who are genetically defective and permits them to breed. The aim of geneticists should be to find ways of preserving and utilizing the favorable genes of humanity instead of promoting the decadence of the genetic pool. The result of much current research is to make non-viable humans viable. However, since the gametes cannot be changed, non-viability is being propagated.

Duda maintains that although as a biochemist, corrections of defects pleases him, as a geneticist, he would prefer research targeted on propagation of outstanding genetic traits.

CSO: 2502/12

END

END OF FICHE

DATE FILMED

JAN 4-85